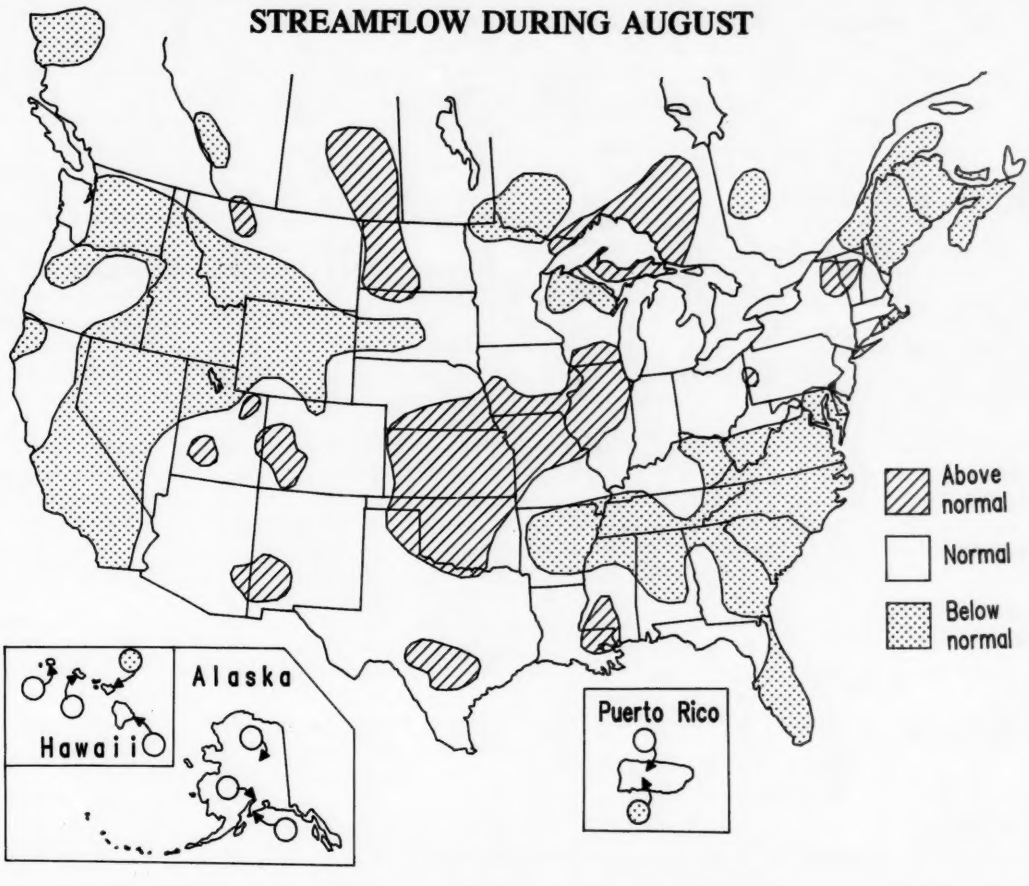
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

AUGUST 1987

STREAMFLOW DURING AUGUST



Severe flooding occurred in Cook and Du Page Counties in Illinois on August 14 and minor flooding occurred in southwestern Iowa August 25–26.

Flows generally increased from July to August in only two States, Arizona and Michigan. Streamflow generally changed variably in Alaska, Hawaii, New Mexico, Louisiana, Mississippi, Florida, Georgia, North Carolina, New Jersey, Connecticut, Illinois, Iowa, and Minnesota. Flow generally decreased in the rest of southern Canada and the United States.

Streamflow was in the normal to above-normal range at 59.7 percent of the 191 reporting index stations in southern Canada, the United States, and Puerto Rico, compared with the 58 percent in those ranges for last month. This is the lowest percentage of stations with flow in the normal to above-normal range for August in the last 5 years. Total August flow was the lowest for August in the last 5 years, about 176,520 cfs and 12.3 percent below that of August 1985, the second lowest August during the period.

Mean August elevations for the Great Lakes (provisional National Ocean Service data) ranged from 0.86 foot (Lake Erie) to 1.70 feet (Lake Ontario) lower than those for August 1986.

The level of Utah's Great Salt Lake fell 0.60 foot during August, reaching 4,210.10 feet above National Geodetic Vertical Datum of 1929 on August 31.

Contents of 74 percent of reporting reservoirs were near or above average for the end of August, compared with 78 percent for the end of July.

The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged a below-normal 643,500 cfs during August, 12.8 percent below median and 26.5 percent below last month's flow. Mean flow of the Columbia River at The Dalles, Oregon, set a record low for August after decreasing by about 41 percent from that for July and was in the below-normal range for the third consecutive month.

SURFACE-WATER CONDITIONS DURING AUGUST 1987

Severe flooding occurred in Cook and Du Page Counties in Illinois on August 14 (see facing page) and minor flooding occurred in Iowa August 25–26 in the Nishnabotna, Grand, Chariton, and Skunk River basins. The only record peak in Iowa occurred on the Platte River at Diagonal (drainage area 217 square miles), where the discharge was 7,800 cubic feet per second (cfs) on August 25, about 1,380 cfs greater than the October 1973 peak.

Flows generally increased from July to August in only two States: seasonally in Arizona and contraseasonally in Michigan. Streamflow generally changed contraseasonally in North Carolina; seasonally in Alaska, Mississippi, and Florida; variably in Hawaii, New Mexico, Louisiana, Georgia, New Jersey, Connecticut, Illinois, Iowa, and Minnesota. Flow generally decreased in the rest of southern Canada and the United States: variably in Nebraska, Texas, and Nova Scotia; contraseasonally in Puerto Rico; seasonally in all other areas.

Streamflow was in the normal to above-normal range at 59.7 percent of the 191 reporting index stations in southern Canada, the United States, and Puerto Rico, compared with the 58 percent in those ranges for last month. This is the lowest percentage of stations with flow in the normal to above-normal range for August in the last 5 years. Total August flow was the lowest for August in the last 5 years, about 176,520 cfs and 12.3 percent below that of August 1985, the second lowest August during the period.

New August extremes occurred at only five index stations (see table on page 5): three maximums and two minimums. For example, the monthly mean flow of 86,500 cfs (60 percent of median) on the Columbia River at The Dalles, Oregon (drainage area 237,000 square miles), was the lowest in 108 years of record (see hydrograph on page 10), about 7,400 cfs less than the previous August minimum, which occurred in 1985. Hydrographs of streamflow at the other four index stations which recorded new extremes are on the upper half of page 5. The hydrographs on the lower half of page 5 are for sites in four States where flow conditions for this month generally are below normal (Washington and Kentucky), above normal (Colorado), and normal (New Jersey).

Mean August elevations for the Great Lakes (provisional National Ocean Service data) ranged from 0.86 foot (Lake Erie) to 1.70 feet (Lake Ontario) lower than those for August 1986. [*Last month's first sentence should have read as follows:* Mean July elevations for the Great Lakes (provisional National Ocean Service data) ranged from **0.84** foot (**Lake Erie**) to 1.32 feet (Lake Ontario) lower than those for July 1986.] Levels rose from last month only on Lake Superior (+0.19 foot). Levels fell on Lake Huron (−0.19 foot), Lake Erie (−0.31 foot), and Lake Ontario (−0.62 foot). The level of Lake Ontario was below median for the third consecutive month. Stage hydrographs for Lakes Superior, Huron, Erie, and Ontario are on page 5.

The level of Utah's Great Salt Lake fell 0.60 foot during August, reaching 4,210.10 feet above National Geodetic Vertical Datum (NGVD) of 1929 on August 31. Lake level has fallen 1.75 feet since the March 30, 1987, seasonal high of 4,211.85 feet above NGVD of 1929 (see graph on page 5), which equaled the record high set July 3–8, 1986. The lake level is 0.75 foot lower than a year ago, but 5.70 feet higher than it was in August 1983.

Contents of 74 percent of reporting reservoirs were near or above average for the end of August, compared with 78 percent for the end of July. Most reporting reservoirs in Oklahoma, Texas, New Mexico, Colorado, and Utah had contents which were more than 5 percent of normal maximum contents above the average for the end of August. In contrast, most reporting reservoirs in Maine, New Jersey, Maryland, and Nevada had contents which were more than 5 percent of normal maximum contents below the average for the end of August. The following reservoirs or reservoir systems had both a decline of more than 5 percent of normal maximum contents during the month and monthend contents more than 5 percent of normal maximum contents below monthend averages: Gouin (Quebec), Maine's seven reservoir systems, Indian Lake and the New York City reservoir system (New York), Wanaque (New Jersey), the Baltimore Municipal system (Maryland), Narrows (North Carolina), Wisconsin River (Wisconsin), Angostura (South Dakota), Boise River (Idaho), Buffalo Bill (Wyoming), Upper Snake River (Idaho-Wyoming), Rye Patch (Nevada), Lake Tahoe (Arizona-California), and also Folsom Lake, Lake Isabella, Pine Flat Lake, and Shasta Lake (California). Graphs of contents for seven reservoirs are shown on page 8 with contents for the 100 reporting reservoirs given on page 9.

(Continued on page 4.)

CONTENTS

FLOODS OF AUGUST 14-15, 1987, IN NORTHEASTERN ILLINOIS— LAKE COOK, AND DU PAGE COUNTIES

Heavy rains totalling 4–9 inches in the 24 hours ending at noon on August 14 caused severe flooding in Du Page and Cook Counties in the northeastern part of Illinois. New peaks of record were set and the 100-year flood was equalled or exceeded at 9 gaging stations. No damage estimates were made, but there was severe flooding in Chicago (Cook County) and many highways were closed. O'Hare Airport was closed and isolated with 3 feet of water over all roads leading into the airport. The National Weather Service office building at the airport had 3–6 inches of water on the first floor. Governor James Thompson declared the counties of Du Page and Cook as diaster areas.

Rainfall (amounts in inches) for the 24-hour period ending at noon on Friday, August 14, are listed below. (An additional 3 inches of rainfall fell Sunday night and early Monday morning in the vicinity of O'Hare Airport.)

O'Hare Airport, IL	9.35
Des Plaines, IL	7.86
Arlington Heights, IL	7.50
Hanover Park, IL	7.14
Glenview, IL	6.09
Skokie, IL	5.90
Chicago (1), IL	5.81
Chicago (2), IL	4.18
Elmhurst, IL	4.41

Provisional data; subject to revision

FLOOD DATA FOR SELECTED SITES IN ILLINOIS, AUGUST 1987

WRD station number	Stream and place of determination	Drainage area (square miles)	Period of known floods	Maximum flood previously known: Date	Maximum flood previously known: Stage (feet)	Maximum flood previously known: Discharge (cfs)	Maximum during present flood: Date	Maximum during present flood: Stage (feet)	Maximum during present flood: Discharge: Cfs	Maximum during present flood: Discharge: Cfs per square mile	Recurrence interval (years)
	ILLINOIS RIVER BASIN										
05529500	McDonald Creek near Mount Prospect....	7.93	1953–	June 20, 1972	7.58	664	Aug. 14	8.05	910	115	100
				July 31, 1957	8.04	430					
05530990	Salt Creek at Rolling Meadows............	30.5	1951–	Dec. 3, 1982	12.56	1,060	14	14.09	1,710	56	[a]1.4
05531500	Salt Creek at Western Springs..............	114	1946–	Dec. 5, 1982	8.71	2,070	14	10.19	3,200	28	[a]1.4
05532500	Des Plaines River at Riverside.............	630	1944–	Mar. 20, 1948	8.28	6,510	15	9.92	9,600	15	[a]1.2
				Jan. 26, 1969	9.82	(b)					
				Mar. 18, 1919	[c]22.2	7,450					
05534500	North Branch Chicago River at Deerfield.	19.7	1953–	July 22, 1982	10.93	756	14	11.48	900	46	[a]1.1
05535070	Skokie River near Highland Park...........	21.1	1968–	Dec. 3, 1982	8.46	724	14	9.09	860	41	100
05535500	West Branch of North Branch Chicago River at Northbrook.	11.5	1953–	July, 22, 1982	9.66	1,070	14	10.22	1,210	105	100
05536000	North Branch Chicago River at Niles......	100	1951–	June 11, 1967	9.83	2,210	14	11.35	2,550	26	[a]1.2
05540095	West Branch Du Page River near Warrenville.	90.4	1969–	Dec. 3, 1982	4.88	2,160	15	5.84	3,000	33	[a]1.2
				Oct. 11, 1954	5.54	(d)					

[a]Recurrence interval greater than 100 years. Value shown is approximate ratio of discharge to that of 100-year flood.
[b]Backwater from ice.
[c]Site and datum then in use.
[d]Discharge not determined.

NEW EXTREMES DURING AUGUST 1987 AT STREAMFLOW INDEX STATIONS

Station number	Stream and place of determination	Drainage area (square miles)	Years of record	Previous August extremes (period of record)		August 1987			
				Monthly mean in cfs (year)	Daily mean in cfs (year)	Monthly mean in cfs	Percent of median	Daily mean in cfs	Day
				LOW FLOWS					
2392000	Etowah at Canton, Ga......	613	59	328 (1981)	222 (1981)	304 1	43	214	*
14105700	Columbia River (Adjusted) at The Dalles, Oreg.	237,000	108	93,900 (1985)	... ...	86,500	60	84,300	16
				HIGH FLOWS					
5446500	Rock River near Joslin, Ill.	9,549	47	9,318 (1972)	23,500 (1972)	9,410	293	21,900	28
6810000	Nishnabotna River above Hamburg, Iowa	2,806	59	2,987 (1932)	11,900 (1954)	3,960	518	20,400	27
6897500	Grand River near Gallatin, Mo.	2,250	65	2,369 (1982)	21,100 (1982)	4,008	1,838	22,000	15

* Occurred more than once.

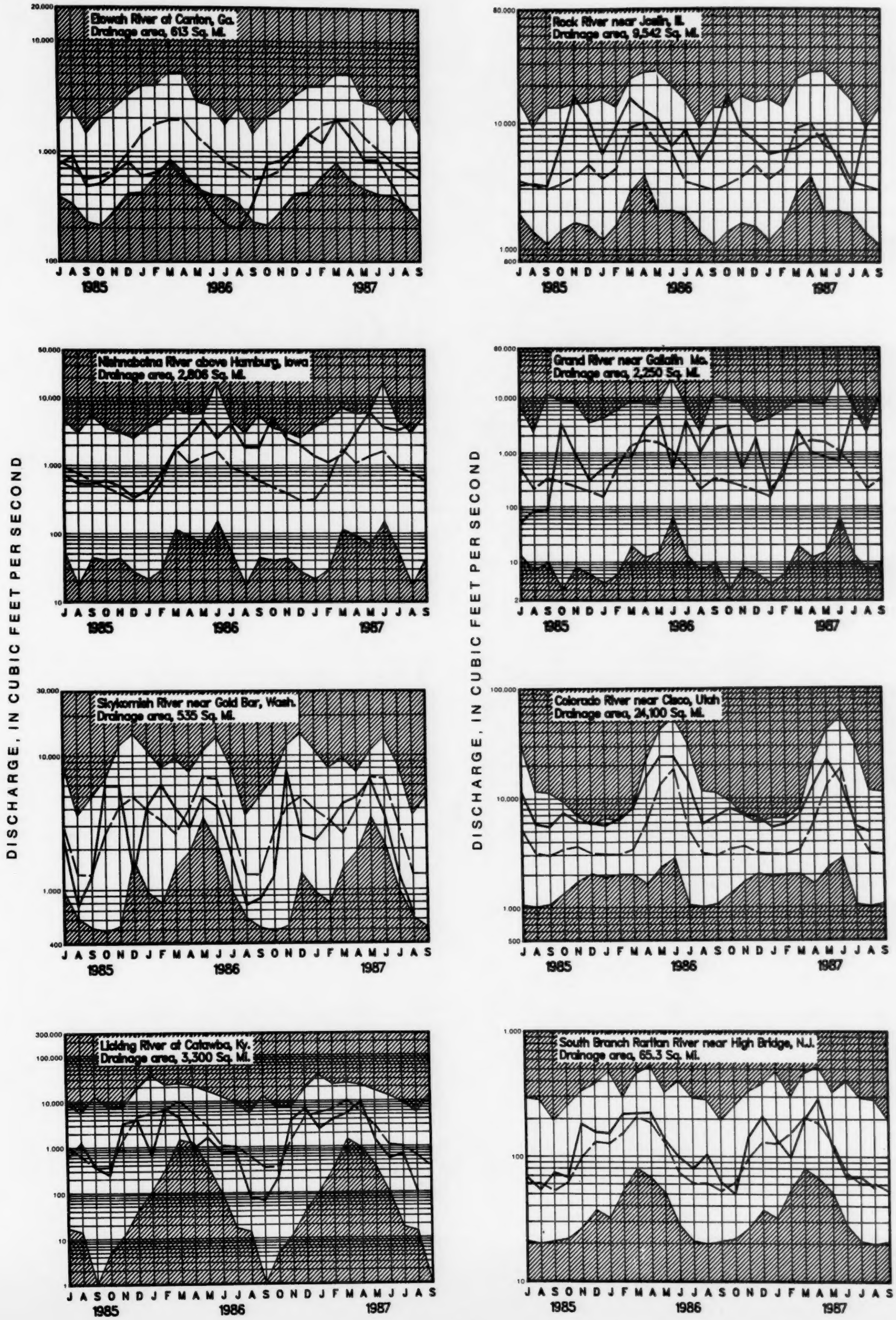
The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged a below-normal 643,500 cfs during August, 12.8 percent below median and 26.5 percent below last month's flow. Mean flow of the St. Lawrence River at Cornwall, Ontario, was in the above-normal range for the 31st consecutive month. Mean flow of the Mississippi River at Vicksburg, Mississippi, decreased by about 36 percent from that for July and moved into the below-normal range. Mean flow of the Columbia River at The Dalles, Oregon, set a record low for August after decreasing by about 41 percent from that for July and was in the below-normal range for the third consecutive month. Flow hydrographs for both the combined and individual flows of the "Big 3" are shown on page 10. Dissolved solids and water temperatures at five large river stations are given on page 10. August flows of the "Big 3" and other large rivers are given in the Flow of Large Rivers table on page 11.

A page from the National Water Conditions Reporting System standard "MS" (monthly streamflow summary) output is reproduced on page 12 exactly as it printed on retrieval from the computer. This page shows monthly flow/runoff and cumulative runoff (water year) conditions at the 48 streamflow index stations in the States and Provinces of the "western region" (those which are west of the North Dakota-Texas axis). The station number is the U.S. Geological Survey identification number and the NWCID is a two-digit State code (leading zero dropped) combined with a two-digit station identification number. The data in the "Change from" column determine the descriptor for month-to-month flow changes (see Explanation of data on page 19) at each station, which are generalized on a State/Province basis.

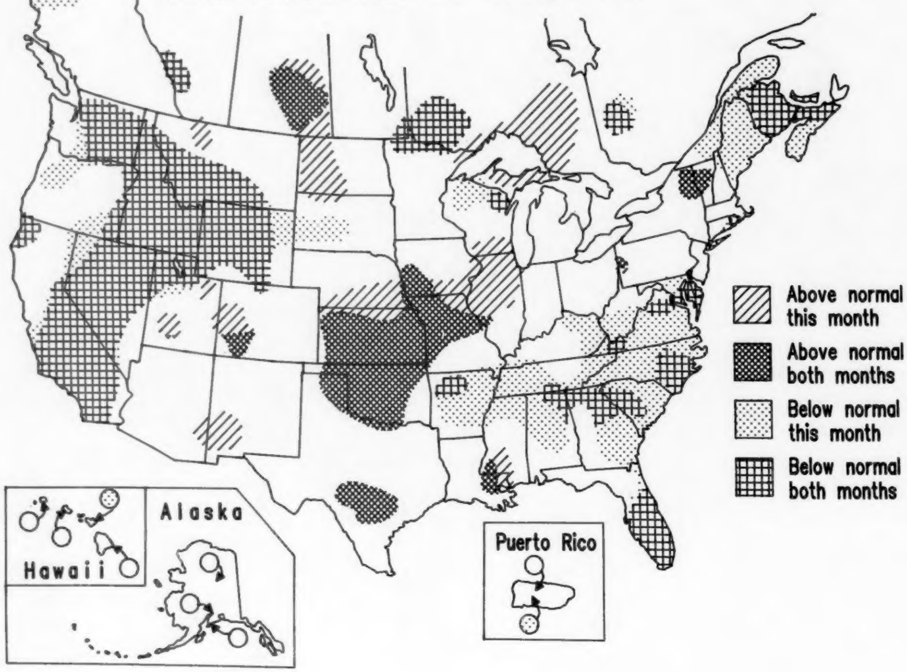
August precipitation (provisional National Weather Service data) was generally an inch or more below normal in parts of Alaska, Hawaii, Washington, Texas, Florida, much of the area extending from southern Illinois to New Jersey, and also scattered areas in Minnesota and New England. Precipitation was generally an inch or more above average in parts of the central Great Lakes States, scattered sites in coastal areas of the Southeast, and also at scattered sites in the midcontinent. Total precipitation exceeded 6 inches at 25 cities scattered around the United States during the month, 12 of them in Florida, Iowa, Illinois, Indiana, and Michigan. Those cities with more than 6 inches of precipitation that also had record-high totals for August (amounts in inches) were: Mobile (10.33), Alabama; Chicago (17.10, wettest month of record), Moline (15.26), and Rockford (11.63), Illinois; Waterloo (8.07), Iowa; Baton Rouge (14.48), Louisiana; Grand Rapids (8.46), Michigan; Pittsburgh (7.87), Pennsylvania; Milwaukee (9.08), Wisconsin. No precipitation fell at: Sacramento, California; Las Vegas and Winnemucca, Nevada; and Medford, Oregon, equaling previously established August record lows. Record low precipitation for August fell at: Kodiak (0.65), Alaska; West Palm Beach (1.73), Florida; and Roanoke (1.06), Virginia. Total Precipitation and Percentage of Normal Precipitation maps are on page 13. Crop Moisture maps (August 15 and 29) on page 14 and Drought Severity maps (August 15 and 29) on page 15 show the differences between short-term and long-term soil moisture for those dates. September through November outlook maps for both temperature and precipitation are on page 19.

MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951–80. Heavy line indicates mean for current period.



PERSISTENCE IN, OR MOVEMENT INTO THE BELOW-NORMAL OR ABOVE-NORMAL FLOW RANGE: JULY TO AUGUST 1987



SUMMARY OF AUGUST 1987 STREAMFLOW

[Flow ranges]

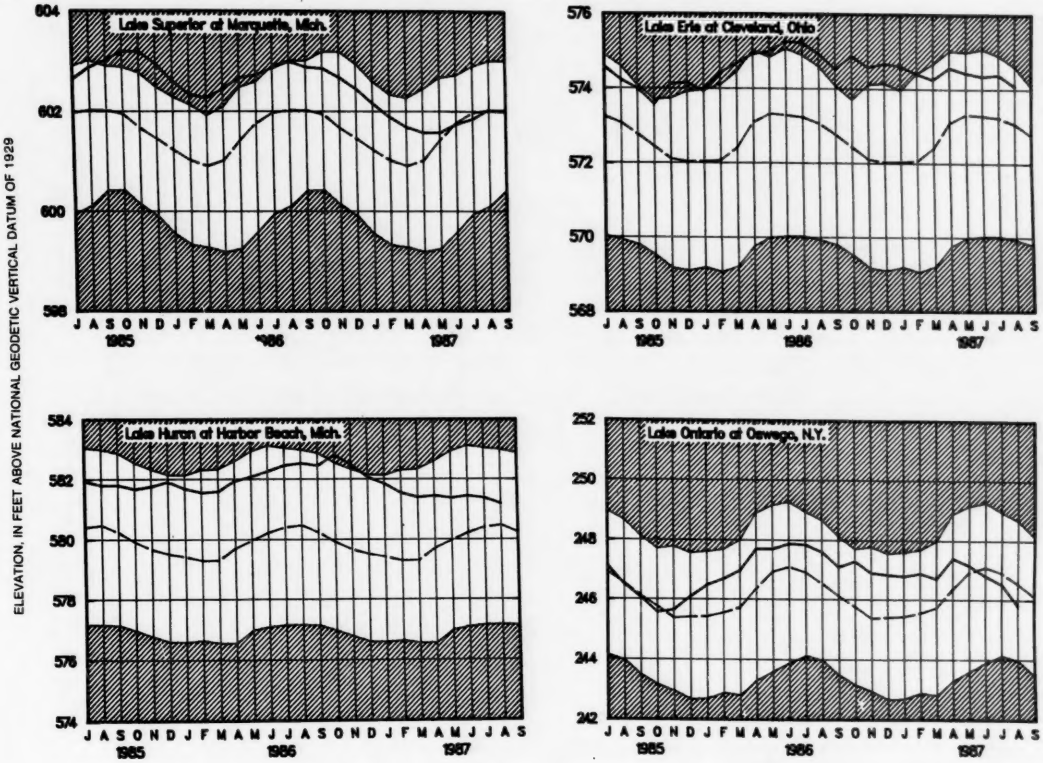
Area	Below-normal range		Normal range		Above-normal range		Number of stations	
	No.	Percent	No.	Percent	No.	Percent	Reporting data	Missing data
Conterminous United States.	65	39.9	71	43.6	27	16.6	163	0
Alaska, Hawaii, and Puerto Rico.	2	20.0	8	80.0	0	0.0	10	0
United States and Puerto Rico.	67	38.7	79	45.7	27	15.6	173	0
Southern Canada........	10	55.6	6	33.3	2	11.1	18	0
Conterminous United States and southern Canada.	75	41.4	77	42.5	29	16.0	181	0
All sites....................	77	40.3	85	44.5	29	15.2	191	0

[Comparison of total monthly means with total monthly medians and last month's total monthly means]

Total of August means (All sites)..	1,262,850	CFS
Total of August medians (All sites)..	1,389,620	CFS
Total of last month's means (All sites)...	1,803,950	CFS
Total of August means compared to total of medians...	−9.1	Percent
Total of August means compared to total of last month's means.............................	−30.0	Percent

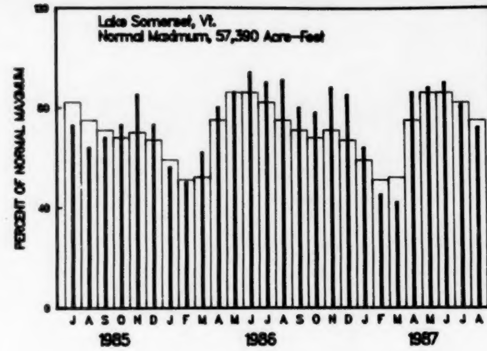
GREAT LAKES ELEVATIONS

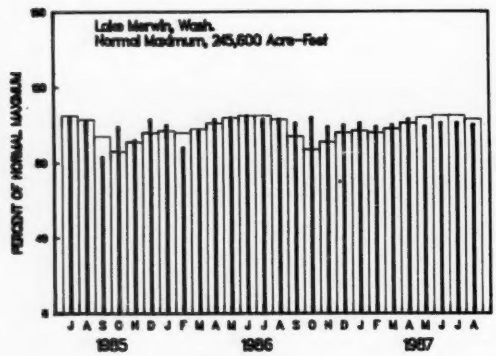
Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period. Data from National Ocean Service.

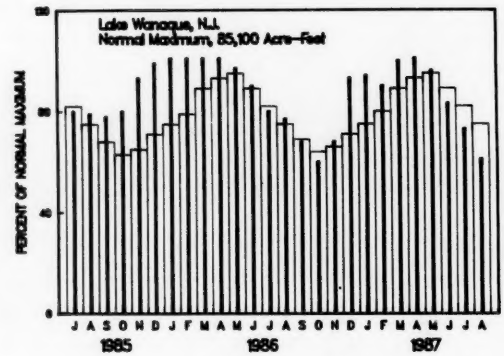


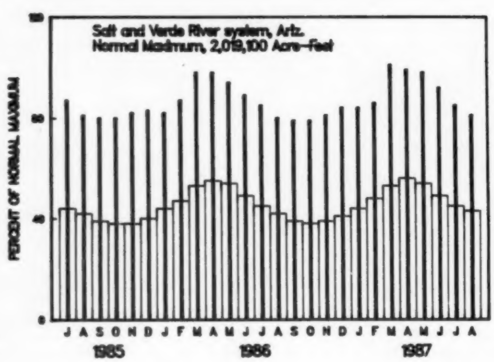
Fluctuations of Great Salt Lake, February 1981 through August 1987

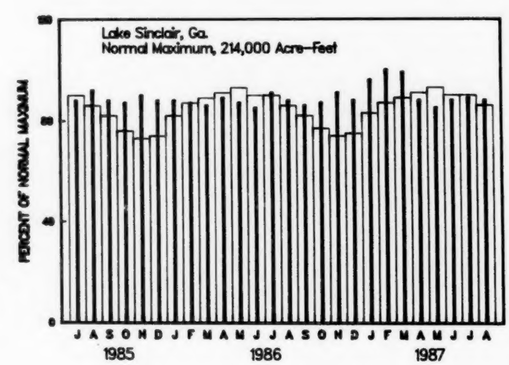
USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS

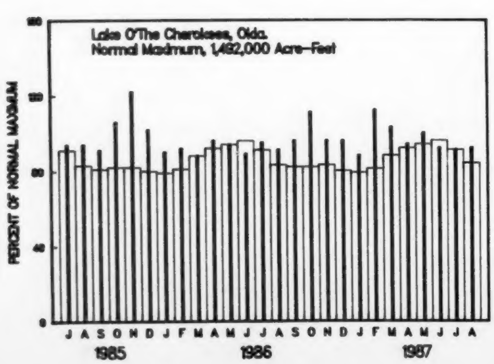


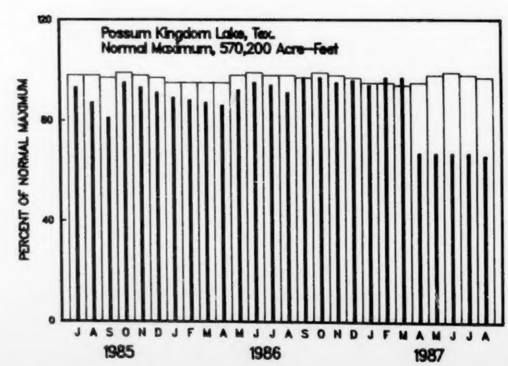












USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF AUGUST 1987

[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

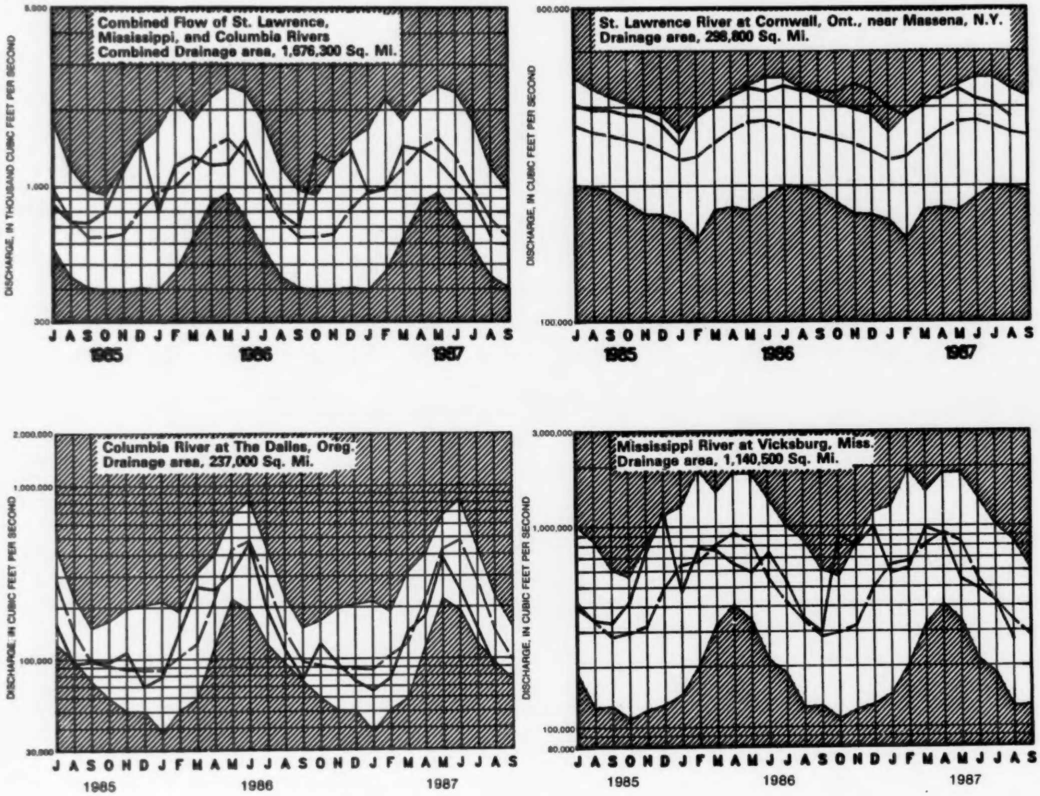
Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	Percent of normal maximum				Normal maximum[a] (acre-feet)
	End of Aug. 1987	End of Aug. 1986	Average for end of Aug.	End of Aug. 1987	
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs(P)	36	50	49	41	[b]226,300
QUEBEC					
Allard (P)	79	79	69	87	280,600
Gouin (P)	60	82	69	66	6,954,000
MAINE					
Seven reservoir systems (MP)	58	79	68	70	4,107,000
NEW HAMPSHIRE					
First Connecticut Lake (P)	79	86	84	88	76,450
Lake Francis (FPR)	77	77	81	87	99,310
Lake Winnipesaukee (PR)	79	88	75	90	165,700
VERMONT					
Harriman (P)	78	77	71	84	116,200
Somerset (P)	72	91	75	81	57,390
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	77	77	77	84	77,920
NEW YORK					
Great Sacandaga Lake (FPR)	79	90	71	88	786,700
Indian Lake (FMP)	58	92	74	92	103,300
New York City reservoir system (MW)	73	90	79	82	1,680,000
NEW JERSEY					
Wanaque (M)	61	77	75	73	85,100
PENNSYLVANIA					
Allegheny (FPR)	48	49	43	49	1,180,000
Pymatuning (FMR)	100	95	88	100	188,000
Raystown Lake (FR)	67	67	52	68	761,900
Lake Wallenpaupack (PR)	62	67	65	73	157,800
MARYLAND					
Baltimore municipal system (M)	79	61	88	88	261,900
NORTH CAROLINA					
Bridgewater (Lake James) (P)	90	89	88	95	288,800
Narrows (Badin Lake) (P)	86	75	97	93	128,900
High Rock Lake (P)	74	62	74	82	234,800
SOUTH CAROLINA					
Lake Murray (P)	83	90	73	88	1,614,000
Lakes Marion and Moultrie (P)	79	89	70	83	1,862,000
SOUTH CAROLINA–GEORGIA					
Clark Hill (FP)	70	42	66	81	1,730,000
GEORGIA					
Burton (PR)	96	97	86	96	104,000
Sinclair (MPR)	88	88	86	89	214,000
Lake Sidney Lanier (FMPR)	54	34	57	62	1,686,000
ALABAMA					
Lake Martin (P)	97	76	86	97	1,375,000
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	42	40	46	57	2,293,000
Douglas Lake (FPR)	46	28	46	67	1,394,000
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	68	54	68	77	1,012,000
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	54	55	54	68	2,880,000
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	63	43	67	74	1,478,000
WISCONSIN					
Chippewa and Flambeau (PR)	76	82	76	77	365,000
Wisconsin River (21 reservoirs) (PR)	52	81	65	59	399,000
MINNESOTA					
Mississippi River headwater system (FMR)	41	43	34	42	1,640,000
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	86	93	93	88	22,700,000
SOUTH DAKOTA					
Angostura (I)	69	78	76	81	127,600
Belle Fourche (I)	57	39	39	66	185,200
Lake Francis Case (FIP)	73	77	77	81	4,834,000
Lake Oahe (FIP)	88	92	. . .	90	22,530,000
Lake Sharpe (FIP)	101	102	100	97	1,725,000
Lewis and Clark Lake (FIP)	90	92	95	86	432,000

Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	Percent of normal maximum				Normal maximum[a] (acre-feet)
	End of Aug. 1987	End of Aug. 1986	Average for end of Aug.	End of Aug. 1987	
NEBRASKA					
Lake McConaughy (IP)	74	80	69	79	1,948,000
OKLAHOMA					
Eufaula (FRP)	95	94	82	99	2,378,000
Keystone (FPR)	87	93	89	91	661,000
Tenkiller Ferry (FPR)	101	105	92	102	628,200
Lake Altus (FIMR)	83	43	47	101	133,000
Lake O'The Cherokees (FPR)	92	91	84	91	1,492,000
OKLAHOMA–TEXAS					
Lake Texoma (FMPRW)	93	86	91	98	2,722,000
TEXAS					
Bridgeport (IMW)	93	90	49	99	386,400
Canyon (FMR)	101	96	78	140	385,600
International Amistad (FIMPW)	97	53	79	98	3,497,000
International Falcon (FIMPW)	95	36	63	91	2,668,000
Livingston (IMW)	96	97	87	99	1,788,000
Possum Kingdom (IMPRW)	66	91	97	67	570,200
Red Bluff (PI)	73	59	23	75	307,000
Toledo Bend (P)	78	91	85	85	4,472,000
Twin Buttes (FIM)	75	22	27	79	177,800
Lake Kemp (IMW)	96	95	83	101	268,000
Lake Meredith (FWM)	37	25	39	38	796,900
Lake Travis (FIMPRW)	95	86	76	101	1,144,000
MONTANA					
Canyon Ferry (FIMPR)	77	83	87	80	2,043,000
Fort Peck (FPR)	84	81	89	85	18,910,000
Hungry Horse (FIPR)	93	96	95	99	3,451,000
WASHINGTON					
Ross (PR)	95	99	95	99	1,052,000
Franklin D. Roosevelt Lake (IP)	96	94	103	98	5,022,000
Lake Chelan (PR)	98	98	98	98	676,100
Lake Cushman (PR)	100	94	96	102	359,500
Lake Merwin (P)	100	103	103	101	245,600
IDAHO					
Boise River (4 reservoirs) (FIP)	32	57	59	48	1,235,000
Coeur d'Alene Lake (P)	98	98	76	100	238,500
Pend Oreille Lake (FP)	98	98	100	98	1,561,000
IDAHO–WYOMING					
Upper Snake River (8 reservoirs) (MP)	34	66	58	52	4,401,000
WYOMING					
Boysen (FIP)	94	93	87	95	802,000
Buffalo Bill (IP)	63	70	89	78	421,300
Keyhole (F)	41	32	46	43	193,800
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	59	72	52	67	3,056,000
COLORADO					
John Martin (FIR)	74	55	19	88	364,400
Taylor Park (IR)	89	91	79	95	106,200
Colorado-Big Thompson project (I)	73	84	64	80	730,300
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	92	95	. . .	94	31,620,000
UTAH–IDAHO					
Bear Lake (IPR)	73	93	64	76	1,421,000
CALIFORNIA					
Folsom (FIP)	52	68	68	60	1,000,000
Hetch Hetchy (MP)	75	91	70	82	360,400
Isabella (FIR)	29	67	36	36	568,100
Pine Flat (FI)	11	66	44	20	1,001,000
Clair Engle Lake (Lewiston) (P)	84	85	79	87	2,438,000
Lake Almanor (P)	96	91	59	96	1,036,000
Lake Berryessa (FIMW)	74	89	80	77	1,600,000
Millerton Lake (FI)	37	58	44	42	503,200
Shasta Lake (FIPR)	49	75	71	61	4,377,000
CALIFORNIA–NEVADA					
Lake Tahoe (IPR)	51	89	63	59	744,600
NEVADA					
Rye Patch (I)	43	81	68	56	194,300
ARIZONA–NEVADA					
Lake Mead and Lake Mohave (FIMP)	92	91	74	91	27,970,000
ARIZONA					
San Carlos (IP)	57	66	20	63	935,100
Salt and Verde River system (IMPR)	81	80	43	85	2,019,100
NEW MEXICO					
Conchas (FIR)	96	86	84	94	330,100
Elephant Butte and Caballo (FIPR)	102	94	31	94	2,442,000

[a] 1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second day.
[b] Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

HYDROGRAPHS FOR THE "BIG THREE" RIVERS

Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951–80. Heavy line indicates mean for current period.



Provisional data; subject to revision

DISSOLVED SOLIDS AND WATER TEMPERATURES, FOR AUGUST 1987, AT DOWNSTREAM SITES ON FIVE LARGE RIVERS

Station number	Station name	August data of following calendar years	Stream discharge during month: Mean (cfs)	Dissolved-solids concentration[a]: Minimum (mg/L)	Dissolved-solids concentration[a]: Maximum (mg/L)	Dissolved-solids discharge[a] (tons per day): Mean	Dissolved-solids discharge[a] (tons per day): Minimum	Dissolved-solids discharge[a] (tons per day): Maximum	Water temperature[b]: Mean in °C	Water temperature[b]: Minimum, in °C	Water temperature[b]: Maximum, in °C
01463500	Delaware River at Trenton, N.J.	1987	4,297	104	134	1,417	1,002	2,441	25.5	20.5	29.5
	(Morrisville, Pa.).	1945—86	6,066	67	158	....	505	21,500	...	17.5	30.0
		(Extreme yr)		(1945)	(1967)		(1965)	(1955)			
			[c]4,547								
07289000	Mississippi River at	1987	271,000	263	327	211,900	182,200	241,400	30.0	27.0	31.0
	Vicksburg, Miss.	1976—86	387,000	200	345	267,700	118,000	442,000	29.5	26.0	34.0
		(Extreme yr)		(1980)	(1986)		(1977)	(1979)			
			[c]337,900								
03612500	Ohio River at lock and dam 53,	1987	80,000	131	212	....	23,300	71,600	...	27.0	30.5
	near Grand Chain, Ill. (stream-	1955—86	132,600	121	339	....	4,490	246,000	...	17.0	30.5
	flow station at Metropolis, Ill.).	(Extreme yr)		(1983)	(1977)		(1981)	(1958)			
			[c]121,500								
06934500	Missouri River at Hermann,	1987	76,300	254	515	83,400	66,500	160,000	25.5	23.0	28.0
	Mo. (60 miles west of	1976—86	71,940	218	535	78,640	43,000	180,000	27.0	22.0	31.0
	St. Louis, Mo.).	(Extreme yr)		(1981)	(1979)		(1977)	(1982)			
			[c]55,910								
14128910	Columbia River at Warrendale,	1987	104,000	83	91	24,700	20,700	30,400	20.5	19.5	21.5
	Oreg. (streamflow station at	1976—86	137,500	71	100	31,800	14,200	52,500	20.5	18.5	22.0
	The Dalles, Oreg.).	(Extreme yr)		(1976)	(1977)		(1978)	(1976)			
			[c]143,600								

[a]Dissolved-solids concentrations, when not analyzed directly, are calculated on basis of measurements of specific conductance.
[b]To convert °C to °F: [(1.8 X °C) + 32] = °F.
[c]Median of monthly values for 30-year reference period, water years 1951—80, for comparison with data for current month.

Provisional data; subject to revision

FLOW OF LARGE RIVERS DURING AUGUST 1987

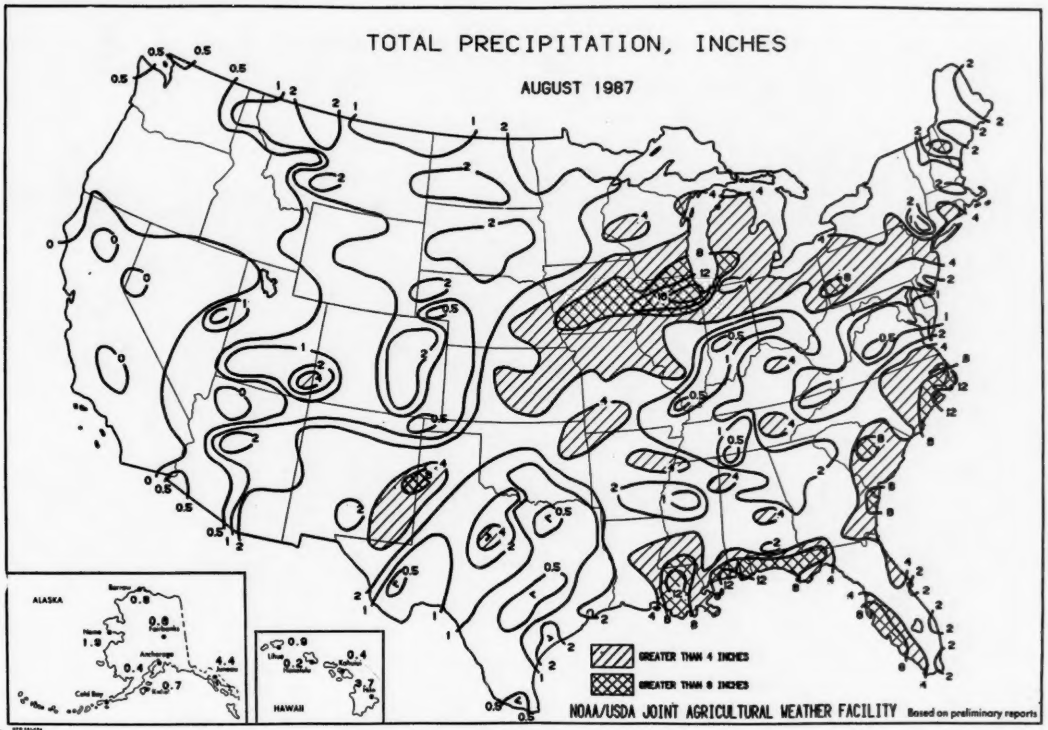
Station number	Stream and place of determination	Drainage area (square miles)	Average discharge through September 1980 (cubic feet per second)	August 1987: Monthly mean discharge (cubic feet per second)	August 1987: Percent of median monthly discharge, 1951–80	August 1987: Change in discharge from previous month (percent)	August 1987: Discharge near end of month: Cubic feet per second	August 1987: Discharge near end of month: Million gallons per day	August 1987: Discharge near end of month: Date
01014000	St. John River below Fish River at Fort Kent, Maine	5,690	9,647	2,275	55	−61	1,330	859	31
01318500	Hudson River at Hadley, N.Y.	1,664	2,909	1,290	123	−34	1,640	1,059	31
01357500	Mohawk River at Cohoes, N.Y.	3,456	5,734	1,330	83	−35	2,000	1,300	31
01463500	Delaware River at Trenton, N.J.	6,780	11,750	4,297	95	−37	7,160	4,627	31
01570500	Susquehanna River at Harrisburg, Pa.	24,100	34,530	5,930	68	−66	4,560	2,947	26
01646500	Potomac River near Washington, D.C.	11,560	[1]11,490	[1]1,940	56	−63	1,950	1,260	31
02105500	Cape Fear River at William O. Huske Lock near Tarheel, N.C.	4,810	5,005	1,150	46	−1	.....	.....	...
02131000	Pee Dee River at Peedee, S.C.	8,830	9,851	3,870	72	−48	2,140	1,383	31
02226000	Altamaha River at Doctortown, Ga.	13,600	13,880	2,810	47	−60	2,340	1,512	31
02320500	Suwannee River at Branford, Fl.	7,880	6,987	4,700	86	−15	.....	.....	...
02358000	Apalachicola River at Chattahoochee, Fl.	17,200	22,570	11,500	86	−40	.....	.....	...
02467000	Tombigbee River at Demopolis lock and dam near Coatopa, Ala.	15,400	23,300	3,121	66	−52	1,050	678	31
02489500	Pearl River near Bogalusa, La.	6,630	9,768	10,573	393	+196	3,220	2,081	31
03049500	Allegheny River at Natrona, Pa.	11,410	[1]19,480	[1]6,250	113	−70	6,660	4,304	24
03085000	Monongahela River at Braddock, Pa.	7,337	[1]12,510	[1]3,390	80	−30	2,750	1,777	20
03193000	Kanawha River at Kanawha Falls, W.Va.	8,367	12,590	2,832	63	−39	2,740	1,770	30
03234500	Scioto River at Higby, Ohio	5,131	4,547	796	65	−89	610	394	31
03294500	Ohio River at Louisville, Ky.[2]	91,170	11,600	31,400	86	−71	40,900	26,430	31
03377500	Wabash River at Mount Carmel, Ill.	28,635	27,220	7,420	82	−66	5,180	3,347	30
03469000	French Broad River below Douglas Dam, Tenn.	4,543	6,798	2,121	66	−39	.....	.....	...
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wis.[2]	6,150	4,163	1,862	87	+4	1,676	1,083	31
04264331	St. Lawrence River at Cornwall, Ontario–near Massena, N.Y.[3]	298,800	242,700	286,000	108	−6	283,000	182,900	31
02NG001	St. Maurice River at Grand Mere, Quebec	16,300	25,150	10,300	62	−38	20,500	13,250	31
05082500	Red River of the North at Grand Forks, N.Dak.	30,100	2,551	1,920	168	−47	1,250	807	27
05133500	Rainy River at Manitou Rapids, Minn.	19,400	11,830	3,880	39	−17	3,550	2,294	26
05330000	Minnesota River near Jordan, Minn.	16,200	3,402	1,521	117	−41	1,100	710	31
05331000	Mississippi River at St. Paul, Minn.	36,800	[1]10,610	6,816	93	−5	4,400	2,840	31
05365500	Chippewa River at Chippewa Falls, Wis.	5,600	5,100	1,444	50	−39	1,400	900	31
05407000	Wisconsin River at Muscoda, Wis.	10,300	8,617	5,516	105	+15	3,832	2,476	31
05446500	Rock River near Joslin, Ill.	9,551	5,873	9,410	294	+215	19,000	12,300	31
05474500	Mississippi River at Keokuk, Iowa	119,000	62,620	60,341	150	+55	81,800	52,870	31
06214500	Yellowstone River at Billings, Mont.	11,796	7,038	3,910	72	−36	4,860	3,141	31
06934500	Missouri River at Hermann, Mo.	524,200	79,490	73,560	132	−26	105	67	31
07289000	Mississippi River at Vicksburg, Miss.[4]	1,140,500	576,600	271,000	80	−36	285,000	184,200	28
07331000	Washita River near Dickson, Okla.	7,202	1,368	1,223	375	−65	1,100	710	31
08276500	Rio Grande below Taos Junction Bridge, near Taos, N.Mex.	9,730	725	275	95	−65	223	144	21
09315000	Green River at Green River, Utah	44,850	6,298	2,986	93	−2	4,400	2,840	26
11425500	Sacramento River at Verona, Calif.	21,257	18,820	13,000	121	−7	12,900	8,340	26
13269000	Snake River at Weiser, Idaho	69,200	18,050	8,780	79	+5	8,310	5,370	31
13317000	Salmon River at White Bird, Idaho	13,550	11,250	3,100	54	−36	3,010	1,945	31
13342500	Clearwater River at Spalding, Idaho	9,570	15,480	3,190	84	−33	3,450	2,229	31
14105700	Columbia River at The Dalles, Oreg.[5]	237,000	[1]193,100	[1]86,500	60	−41	97,000	62,700	30
14191000	Willamette River at Salem, Oreg.	7,280	[1]23,510	[1]2,990	74	−41	6,630	4,285	30
15515500	Tanana River at Nenana, Alaska	25,600	23,460	53,270	96	−13	395,000	255,300	31
08MF005	Fraser River at Hope, British Columbia.	83,800	96,290	107,000	85	−26	70,970	45,870	31

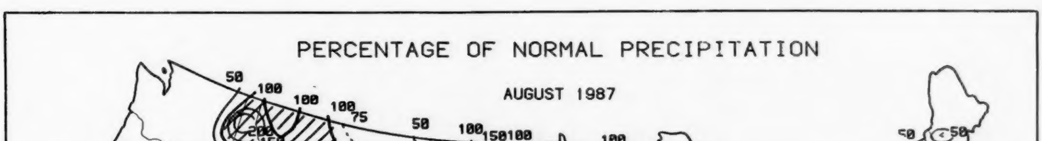
[1]Adjusted.
[2]Records furnished by Corps of Engineers.
[3]Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[4]Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[5]Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

WESTERN REGION
MONTHLY STREAMFLOW AND RUNOFF CONDITIONS FOR AUGUST 1987

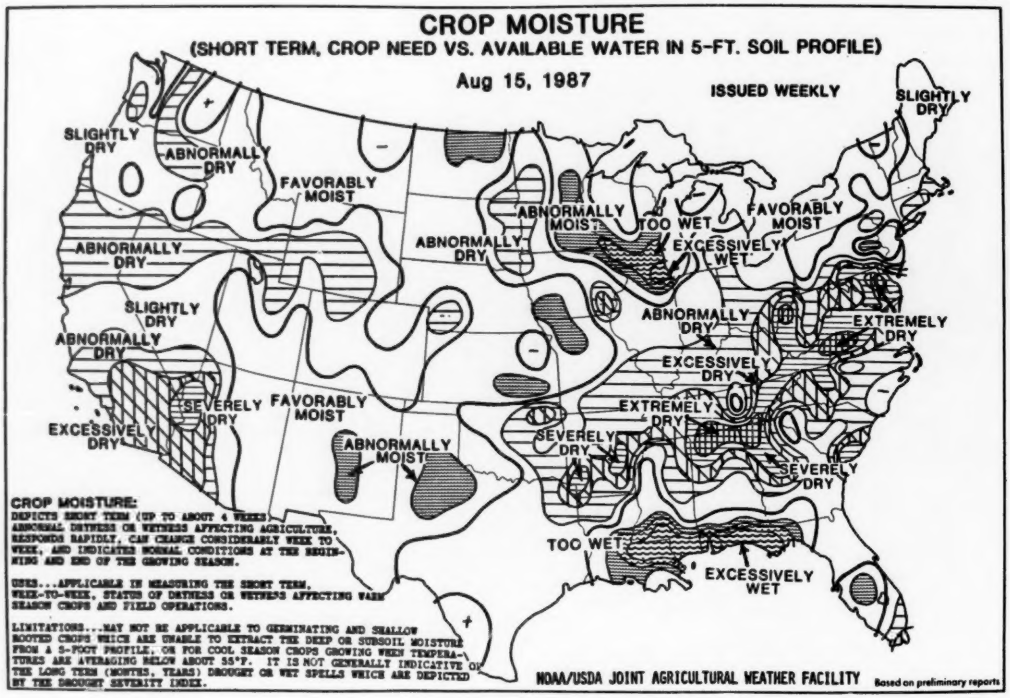
Station number	NWCID	Monthly mean flow in cfs	Percent of Mdn.	Range	Number of consecutive months in flow range	Percent change from JULY to AUG.		Runoff (inch)	Cumulative runoff (inch)	Percent Cmr	Departure (inch)
						Mean flow	Median				
9415000	401	140	115	N	01	−7	+58	0.03	0.46	119	0.08
9448500	402	642	233	E	05	+195	+67	0.09	0.92	216	0.49
9471000	403	84.2	62	N	01	+1,730	+39	0.08	0.22	59	−0.15
9498500	404	569	140	N	03	+190	+85	0.15	3.27	227	1.83
9508500	405	220	84	N	01	+86	+61	0.04	1.08	116	0.15
10296000	601	36.0	33	D2	04	−44	−71	0.23	8.74	48	−9.48
11098000	602	0.09	20	D	05	−64	−44	0.01	1.11	33	−2.27
11427000	604	29.1	48	D3	10	−35	−52	0.10	1.04	31	−22.23
11532500	605	244	79	D	05	−26	−30	0.46	61.31	69	−27.64
11425500	606	13,000	121	N	01	−7	+10	0.71	7.34	56	−5.67
11264500	609	24.4	38	D	04	−66	−80	0.15	11.58	46	−13.65
6710500	801	50.0	124	N	03	−30	−15	0.35	6.28	212	3.32
9085000	803	766	95	N	03	−42	−54	0.61	10.94	108	0.85
9239500	804	123	87	N	02	−31	−53	0.23	7.52	73	−2.72
9361500	805	760	172	E	38	−49	−42	1.27	22.15	169	9.05
13037500	1601	3,490	65	D	03	−32	−49	0.70	12.27	78	−3.44
13269000	1606	8,780	79	D	07	+4	+0	0.15	2.65	86	−0.43
13317000	1607	3,100	54	D	04	−35	−60	0.26	6.11	51	−5.87
13342500	1608	3,190	84	D	08	−32	−65	0.38	11.48	53	−10.29
6099500	3001	548	151	E	01	−42	−65	0.19	2.95	74	−1.04
6191500	3002	1,820	54	D	03	−37	−54	0.80	10.21	62	−6.39
12354500	3003	2,000	57	D	04	−30	−63	0.22	5.17	54	−4.42
12358500	3004	1,160	81	N	01	−39	−64	1.19	26.08	76	−8.16
6214500	3006	3,910	72	D	03	−36	−63	0.38	5.39	62	−3.31
10322500	3201	21.0	51	D	03	−52	−81	0.00	0.47	43	−0.64
8378500	3501	87.9	102	N	02	−13	+15	0.54	10.44	201	5.25
8408500	3502	14.1	208	N	03	+147	−20	0.02	0.24	197	0.12
9430500	3503	235	273	E	01	+303	+84	0.15	1.27	171	0.52
8276500	3506	275	95	N	01	−65	−11	0.03	2.27	314	1.54
14046500	4101	134	92	N	02	−64	−72	0.03	3.64	68	−1.72
14301500	4102	82.0	76	N	03	−36	−21	0.59	79.17	80	−20.20
14321000	4103	1,170	98	N	02	−33	−22	0.37	20.91	76	−6.56
14105700	4106	86,500	60	D1	03	−41	−48	0.42	7.76	73	−2.83
14191000	4107	2,990	74	D	01	−41	−26	0.47	33.04	74	−11.44
9180500	4901	4,855	156	E	01	−12	−40	0.23	4.68	151	1.59
9299500	4902	165	132	E	01	−6	−20	1.68	10.83	90	−1.22
10128500	4903	81.2	78	D	03	−28	−53	0.58	11.99	69	−5.31
10234500	4905	55.8	201	E	01	−25	−50	0.71	7.20	128	1.58
9315000	4906	2,986	93	N	01	−1	−44	0.08	1.60	97	−0.04
9379500	4907	1,716	144	N	01	−64	+0	0.09	2.56	289	1.68
12027500	5301	212	86	N	03	−25	−30	0.27	41.50	98	−1.00
12134500	5302	647	50	*D	03	−49	−56	1.39	80.31	79	−21.69
12422500	5303	883	70	D	05	−40	−55	0.23	13.02	61	−8.26
6298000	5601	76.6	72	D	04	−39	−52	0.43	7.60	66	−3.86
6630000	5602	302	66	D	03	−14	−63	0.08	2.30	65	−1.25
5950100	9501	1,854	84	D	03	−28	−43	2.49	18.11	88	−2.47
8960100	9601	25,141	73	D	01	−65	−48	1.77	26.41	103	0.81
8960600	9606	106,989	85	N	01	−26	−33	1.47	13.02	85	−2.26

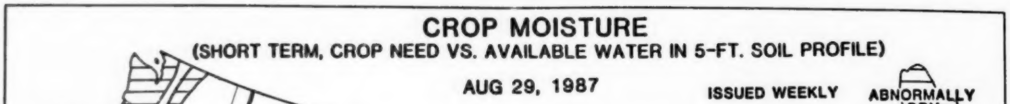
NOTE: The above listing is one page of the National Water Conditions Reporting System standard "MS" (monthly streamflow summary) output by regions. All columns are self-explanatory except the "Range" column. Range descriptors are: E=above normal; N=normal; D=below normal; * preceding range descriptor indicates new daily extreme; number after range descriptor indicates whether monthly mean is within the three highest or lowest of record; that is, 1 means new extreme.





(From *Weekly Weather and Crop Bulletin* prepared and published by the NOAA/USDA Joint Agricultural Weather Facility)





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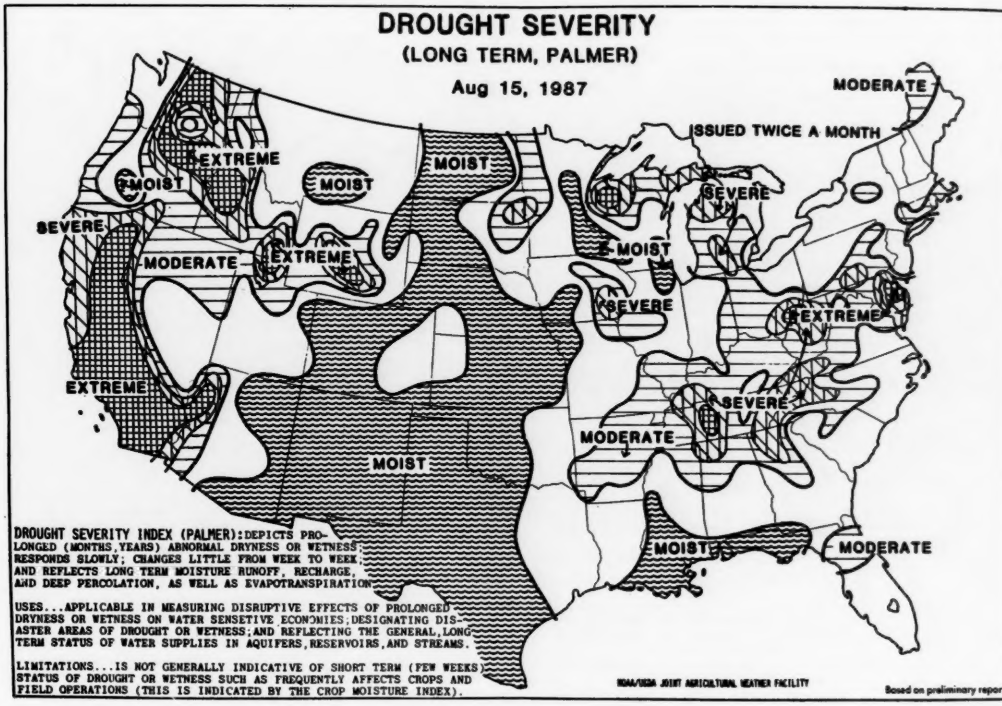
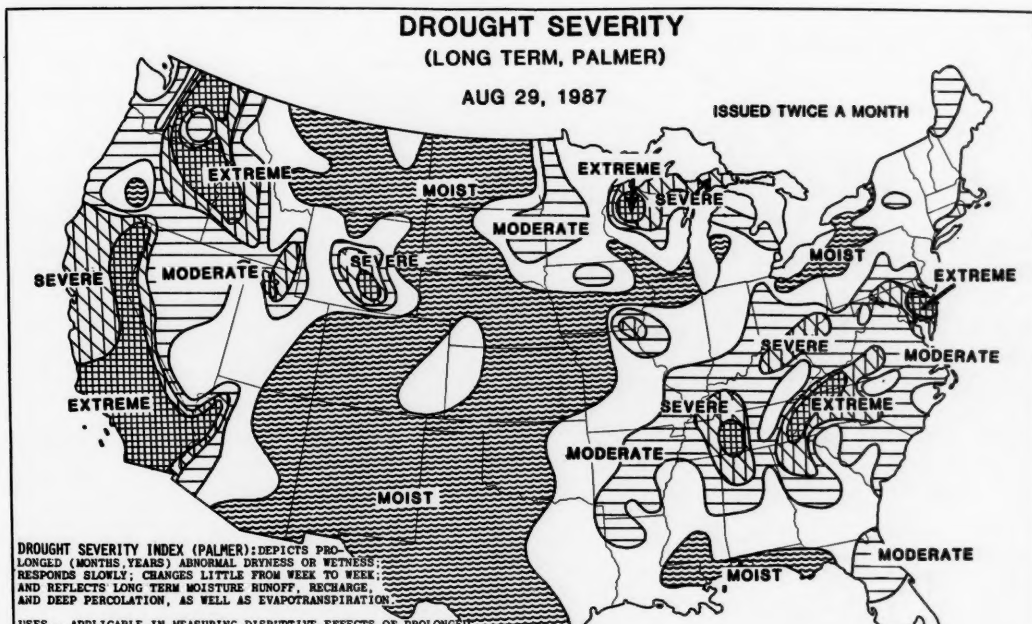




(From *Weekly Weather and Crop Bulletin* prepared and published by the NOAA/USDA Joint Agricultural Weather Facility)

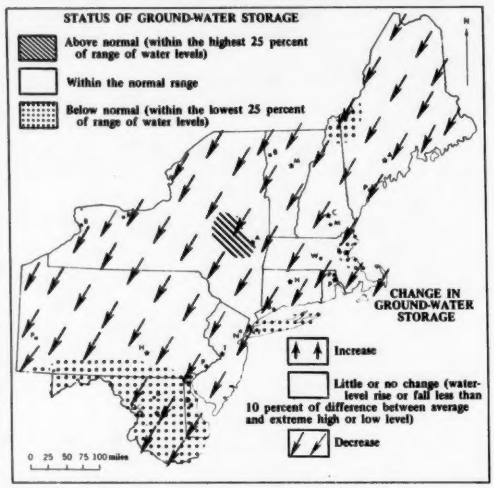
GROUND-WATER CONDITIONS DURING AUGUST 1987

Ground-water levels declined seasonally in nearly the entire Northeast region. (See map.) Levels near the end of August were near average for this time of the year in most of the region, except for Maryland and Delaware where below-average water-level conditions prevailed. Levels were below average also on Long Island, New York, in extreme northern New Hampshire and an adjoining part of Maine, and in part of the Boston, Massachusetts, metropolitan area. Levels were above average in part of east-central New York State.

In the Southeastern States, ground-water levels declined in Kentucky, Virginia, Arkansas, and Mississippi. Changes were mixed in West Virginia, North Carolina, Louisiana, and Georgia. A new low ground-water level for August occurred in the key well at Memphis, Tennessee, despite a slight net rise during the month. Several wells in alluvium in the central delta of the Mississippi River were reported to have reached new August low levels.

In the central and western Great Lakes States, ground-water levels rose in Iowa, declined in Wisconsin and Ohio, and changed variably in Minnesota and Michigan. Water levels were above average in Iowa, below average in Michigan and Ohio, and mixed with respect to average in Minnesota. Levels were reported to be near average in Wisconsin, and in the normal range in Indiana. A new high level for August was reported in the key well at Marion, in Linn County, Iowa.

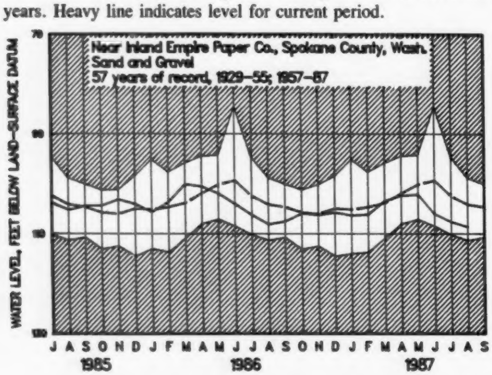
In the Western States, ground-water levels rose in Idaho and declined in Washington, southern California, Utah, and Arizona. Mixed water-level changes occurred in

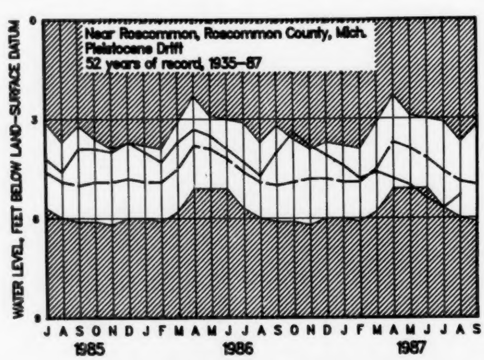


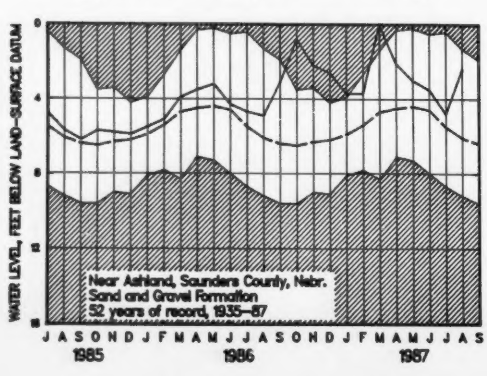
Map showing ground-water storage near end of August and change in ground-water storage from end of July to end of August.

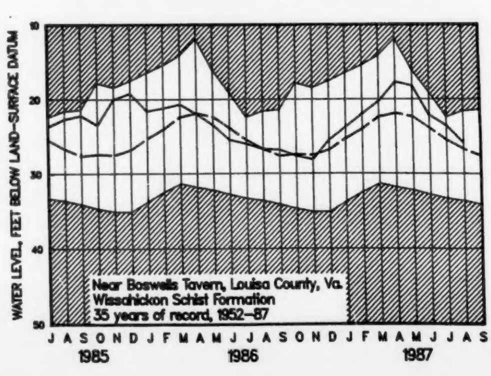
MONTH-END GROUND-WATER LEVELS IN KEY WELLS

Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates average of monthly levels in previous years. Heavy line indicates level for current period.









North Dakota, Nebraska, Nevada, Kansas, New Mexico, and Texas. Water levels were mixed with respect to average in Idaho, North Dakota, Nebraska, southern California, Nevada, Utah, Kansas, New Mexico, and Texas. New high August ground-water levels, despite net declines during the month, occurred in the Steptoe Valley well in Nevada, in the Blanding area well in Utah, and in the Berrendo-Smith well in New Mexico. New August low levels were reported in the Las Vegas Valley well in Nevada, in the Logan area well in Utah, and in the key well at El Paso, in western Texas.

Provisional data; subject to revision

WATER LEVELS IN KEY OBSERVATION WELLS IN SOME REPRESENTATIVE AQUIFERS IN THE CONTERMINOUS UNITED STATES—AUGUST 1987

Aquifer and Location	Water level in feet with reference to land-surface datum	Departure from average in feet	Net change in water level in feet since: Last month	Net change in water level in feet since: Last year	Year records began	Remarks
Glacial drift at Hanska, south-central Minnesota.	−7.26	−0.03	+1.24	−1.96	1942	
Glacial drift at Roscommon in north-central part of Lower Peninsula, Michigan.	−5.33	−0.37	+0.39	−0.60	1935	
Glacial drift at Marion, Iowa	−2.01	+4.15	+3.31	+2.57	1941	August high.
Glacial drift at Princeton in northwestern Illinois.	−8.24	+4.87	+1.36	+2.19	1943	
Petersburg Granite, southeastern Piedmont near Fall Zone, Colonial Heights, Virginia.	−16.50	−0.67	−0.80	+1.36	1939	
Glacial outwash sand and gravel, Louisville, Kentucky (U.S. well no. 2).	−18.59	+6.17	−0.11	−0.85	1946	
500-foot sand aquifer near Memphis, Tennessee (U.S. well no. 2).	−106.35	−16.18	+0.11	−0.33	1941	August low.
Weathered granite, Mocksville area, Davie County, western Piedmont, North Carolina.	−19.11	+1.21	−0.45	−0.89	1932	
Sparta Sand in Pine Bluff industrial area, Arkansas.	−232.10	−23.36	−1.60	−6.60	1958	
Eutaw Formation in the City of Montgomery, Alabama (U.S. well no. 4).	−29.9	−6.2	−6.5	−2.0	1952	
Limestone aquifer on Cockspur Island, Savannah area, Georgia (U.S. well no. 6).	−36.84	−8.86	+0.38	+0.81	1956	
Sand and gravel in Puget Trough, Tacoma, Washington.	−113.43	−2.01	−1.46	+0.25	1952	
Pleistocene glacial outwash gravel, North Pole, northern Idaho (U.S. well no. 3).	−464.0	−5.6	+0.2	−1.9	1929	
Snake River Group: Snake River Plain Aquifer, at Eden, Idaho (U.S. well no. 4).	−117.2	−1.0	+0.8	+2.1	1957	
Alluvial valley fill in Flowell area, Millard County, Utah (U.S. well no. 9).	−23.14	+17.12	−2.66	−10.37	1929	
Alluvial sand and gravel, Platte River Valley, Ashland, Nebraska (U.S. well no. 6).	−2.40	+3.55	+2.42	+2.50	1935	
Alluvial valley fill in Steptoe Valley, Nevada	−8.45	+4.71	−0.32	+0.47	1950	August high.
Pleistocene terrace deposits in Kansas River valley, at Lawrence, northeastern Kansas.	−18.55	+2.40	−1.39	+0.13	1953	
Alluvium and Paso Robles clay, sand, and gravel, Santa Maria, California	−123.90	+16.24	−1.40	+16.48	1957	
Valley fill, Elfrida area, Douglas, Arizona (U.S. well no. 15).	−103.5	−21.6	−0.2	+1.6	1951	
Hueco bolson, El Paso area, Texas	−268.47	−18.03	−0.11	−1.51	1965	
Evangeline aquifer, Houston area, Texas	−309.82	− 5.86	−1.70	+12.67	1965	

Analysis and Interpretation of Water-Quality Trends in Major U.S. Rivers, 1974–81

The abstract and illustrations below are from the report, *Analysis and interpretation of water-quality trends in major U.S. rivers, 1974–81*, by Richard A. Smith, Richard B. Alexander, and M. Gordon Wolman, U.S. Geological Survey Water-Supply Paper 2307, 25 pages, 1987. This report may be purchased for $1.75 from Government Printing Office, Superintendent of Documents, Washington, DC 20402 (check or money order payable to GPO—cite Stock Number 024-001-03556-1; or U.S. Geological Survey, Books and Open-File Reports, Box 25425, Federal Center, Denver, CO 80225 (check or money order payable to U.S. Geological Survey.)

Figure 1. Trends in flow-adjusted concentrations of fecal streptococcus bacteria at NASQAN and NWQSS stations, 1974–81.

Abstract

Water-quality records from two nationwide sampling networks are now of sufficient length to permit nationally consistent analysis of long-term water-quality trends at more than 300 locations on major U.S. rivers. Observed trends in 24 water-quality measures for the period 1974–81 provide evidence of both improvement and deterioration in stream quality during a time of major changes in atmospheric and terrestrial influences on surface waters (see table 1). Particularly noteworthy are widespread decreases in lead and fecal bacteria concentrations (see figure 1) and widespread increases in nitrate, arsenic, and cadmium concentrations. Changes in municipal waste treatment, leaded-gasoline consumption, highway-salt use, and nitrogen-fertilizer application, and regionally variable trends in coal production and combustion during the peroid, appear to be reflected in water-quality changes. There is evidence that atmospheric depostion of a variety of substances has played a surprisingly large role in water-quality changes.

Table 1. Statistical summary of water-quality conditions and trends, 1974–81, at NASQAN and NWQSS sampling stations in the conterminous United States

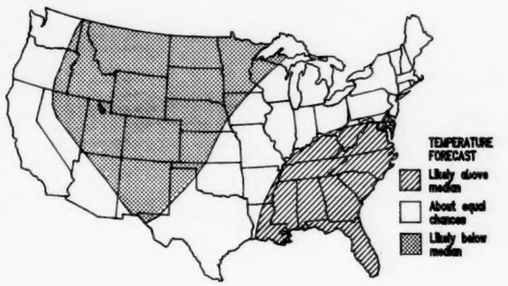
[Concentrations are expressed as milligrams per liter (common constituents) and micrograms per liter (trace elements) except as follows: pH (standard units), fecal bacteria (colonies per 100 milliliters). Chemical concentrations refer to the dissolved form of the constituent unless stated otherwise. Mean concentrations denoted as (<) are estimated to be less than the laboratory detection limit. Laboratory detection limits (micrograms per liter) for trace elements were as follows: Arsenic, 1; cadmium, 2; chromium, 2; iron, 10; lead, 2; manganese, 10; mercury, 0.1; selenium, 1; zinc, 2. Mean concentrations of trace elements were computed as the average of "minimum" and "maximum" estimates of the mean. Minimum and maximum estimates of the mean were obtained by assigning a value of zero and the detection limit, respectively, to "less than" values in the record. Trend slopes are summarized as the median slope among stations showing significant ($p<0.1$) trend and are expressed as the annual percentage change in mean concentration at the station]

Common constituents[1]	Number of stations	Station-mean concentration percentiles			Trends in flow-adjusted concentration			
					Increases		Decreases	
		25th	50th	75th	Number	Median slope (percent/year)	Number	Median slope (percent/year)
Chloride	289	6.7	14.9	53.3	101	3.3	34	-5.5
Sulfate as SO_4	289	10.5	39.9	116.9	78	3.7	38	-3.2
Nitrate, total as N*	383	0.20	0.41	0.89	116	6.7	27	-8.7
Alkalinity as $CaCO_3$	289	42.0	104.3	161.8	18	2.3	75	-2.8
Calcium	289	15.8	38.2	66.8	23	1.8	79	-2.7
Magnesium	289	3.9	11.2	21.7	48	2.6	41	-2.9
Sodium	289	6.8	18.3	68.9	100	3.7	27	-3.7
Potassium	289	1.5	2.8	4.9	66	2.4	39	-3.2
pH	290	7.3	7.8	8.1	70	0.8	54	-0.8
Suspended sediment	276	18.4	66.8	193.2	43	10.7	39	-17.4
Phosphorus, total as P*	381	0.06	0.13	0.29	43	7.4	50	-8.1
Dissolved oxygen*	369	8.7	9.8	10.5	63	2.3	41	-2.4
Dissolved-oxygen deficit*	353	0.4	1.0	1.5	41	14.9	58	-19.7
Fecal coliform bacteria*	305	92	355	1222	16	11.1	45	-34.5
Fecal streptococcus bacteria*	295	173	488	1501	9	14.0	67	-32.0

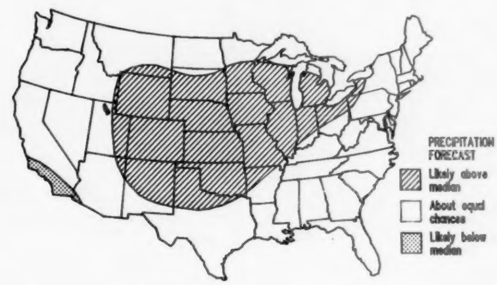
Trace elements	Number of stations	Station-mean concentration percentiles			Trends in concentration	
		25th	50th	75th	Increases (Number of stations)	Decreases (Number of stations)
Lead	292	3	4	6	7	66
Arsenic	293	<1	1	3	62	11
Cadmium	285	<2	<2	<2	48	6
Chromium	161	9	10	10	12	2
Iron	293	36	63	157	27	21
Manganese	286	11	24	51	30	19
Mercury	199	0.2	0.2	0.3	7	2
Selenium	211	<1	<1	1	4	23
Zinc	288	12	15	21	18	32

[1] Constituents marked with asterisk were sampled at both NASQAN and NWQSS stations; other constituents were sampled at NASQAN stations only.

TEMPERATURE OUTLOOK FOR SEPTEMBER THROUGH NOVEMBER 1987



PRECIPITATION OUTLOOK FOR SEPTEMBER THROUGH NOVEMBER 1987



NATIONAL WATER CONDITIONS

AUGUST 1987

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EXPLANATION OF DATA (Revised April 1987)

Cover map shows generalized pattern of streamflow for the month based on provisional data from 183 index gaging stations—18 in Canada, 163 in the United States, and 2 in the Commonwealth of Puerto Rico. Alaska, Hawaii, and Puerto Rico inset maps show streamflow only at the index gaging stations that are located near the point shown by the arrows. Classifications on map are based on comparison of streamflow for the current month at each index station with the flow for the same month in the 30-year reference period, 1951-80. Shorter reference periods are used for one Canadian index station, two Kansas index stations, one New York index station, and the Puerto Rico index stations because of the limited records available.

The *persistence/change* map shows where streamflow has persisted in the above- or below-normal range from last month to this month and also where streamflow is in the above- or below-normal range this month after being in a different range last month. The table below the map shows areal streamflow range conditions for all index stations reporting data for this month and compares total flow of the stations reporting data for both last month and this month.

The comparative data are obtained by ranking the 30 flows for each month of the reference period in order of decreasing magnitude—the highest flow is given a ranking of 1 and the lowest flow is given a ranking of 30. Quartiles (25-percent points) are computed by averaging the 7th and 8th highest flows (upper quartile), 15th and 16th highest flows (middle quartile and median), and the 23rd and 24th highest flows (lower quartile). The upper and lower quartiles set off the highest 25 percent of flows and lowest 25 percent of flows, respectively, for the reference period. The median (middle quartile) is the middle value by definition. For the reference period, 50 percent of the flows are greater than the median, 50 percent are less than the median, 50 percent are between the upper and lower quartiles (in the normal range) 25 percent are greater than the upper quartile (above normal), and 25 percent are less than the lower quartile (below normal). Flow for the current month is then classified as; *above normal* if it is greater than the upper quartile, *in the normal range* if it is between the upper and lower quartiles, and *below normal* if it is less than the lower quartile. Change in flow from the previous month to the current month is classified as *seasonal* if the change is in the same direction as the change in the median. If the change is in the opposite direction of the change in the median, the change is classified as *contraseasonal* (opposite to the seasonal change). For example: at a particular index station, the January median is greater than the December median; if flow for the current January increased from December (the previous month), the increase is seasonal; if flow for the current January decreased from December, the decrease is contraseasonal.

Flood frequency analyses define the relation of flood peak magnitude to probability of occurrence or recurrence interval. *Probability of occurrence* is the chance that a given flood magnitude will be exceeded in any one year. *Recurrence interval* is the reciprocal of probability of occurrence and is the *average* number of years between occurrences. For example, a flood having a probability of occurrence of 0.01 (1 percent) has a recurrence interval of 100 years. *Recurrence intervals imply no regularity of occurrence;* a 100-year flood might be exceeded in consecutive years or it might not be exceeded in a 100-year period.

Statements about *ground-water levels* refer to conditions near the end of the month. The water level in each key observation well is compared with average level for the end of the month determined from the 30-year reference period, 1951-80, or from the entire past record for that well when only limited records are available. Comparative data for ground-water levels are obtained in the same manner as comparative data for streamflow. *Changes in ground-water levels,* unless described otherwise, are from the end of the previous month to the end of the current month.

Dissolved solids and temperature data for August are given for five stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). *Dissolved solids* are minerals dissolved in water and usually consist predominately of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. *Dissloved-solids discharge* represents the total daily amount of dissolved minerals carried by the stream. *Dissolved-solids concentrations* are generally higher during periods of low streamflow, but the highest dissolved-solids *discharges* occur during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at times of low flow.

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